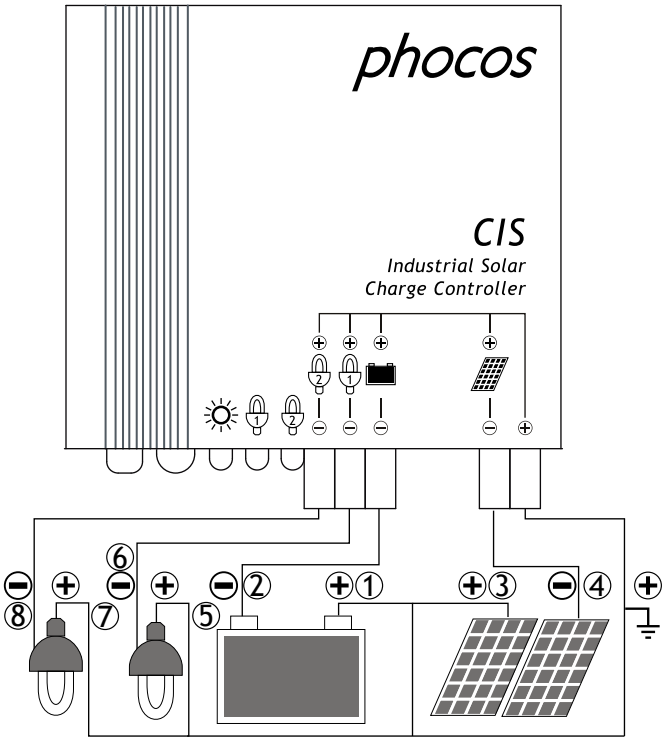
Phocos CIS05-2L/10-2L/20-2L

Solar Charge Controller with Programmable Night-Light Function User Manual (English)

Dear customer, thank you very much for buying this Phocos product. Please read the instructions carefully and thoroughly before using the product. It comes with a number of outstanding features, such as:

- Case protection: IP68 protection, in 1.5 m water depth 72 Hours.
- Dual load
- Control unit (CU) to configure CIS charge controller via infra-red data link
- External temperature sensor for temperatur compensation of charge voltages
- Widely programmable
- 3 stage charging (boost, equalization, float) for flooded battery, 2 stage charging (boost, float) for sleaded battery
- Automatic recognition of system voltage 12/24 V

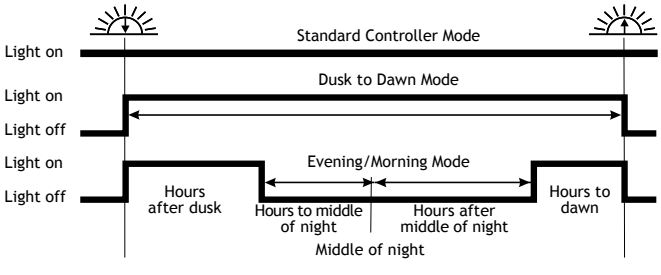
Connecting and Grounding



- Connect wires in order indicated ①②③④⑤⑥⑦⑧to avoid installation faults.
- To avoid any voltage on the wires, first connect the wire to the controller, then to the battery, panel or load.
- Recommended minimum wire size: CIS05: 1.5 mm^2; CIS10: 2.5 mm^2; CIS20: 4 mm^2
- Make sure the wire length between battery and controller is as short as possible.
- Be aware that the positive terminals of the CIS controller are connected together and therefore have the same electrical potential. If any grounding is required, always do this on the positive wires.

Night-Light Function

The CIS controller comes with a sophisticated night-light function. It controls the load output at night and is widely programmable. Dual load outputs are independently programmable.
There are 3 modes available:
Standard Controller, Dusk to Dawn and Evening/Morning modes.



"Middle of night" is detected automatically as the midpoint between dusk and dawn, no setting of a clock is required. It may take several days until the controller has "learned" the middle of the night precisely.
"Middle of night" may be different from 12:00 midnight depending on your location.

The controller recognizes day and night based on the solar array open circuit voltage. This day/night threshold can be modified according to local light conditions and the solar array used.

Testing Function

Pushing the test button on the CU (Control Unit) will switch on both load terminals for 2 minutes. If pressing the button causes a load disconnect event (LVD/SOC, over current) the load will be switched off.

Display & Warning Functions

LED	Status	Function
☀	On	Controller connected to battery, night detected
	Flash	Controller connected to battery, day detected
	Off	No battery connected
1	On	Load 1 low/high voltage disconnect(LVD/HVD)
	Flash	Load 1 over current
	Off	Load 1 OK
2	On	Load 2 low/high voltage disconnect(LVD/HVD)
	Flash	Load 2 over current
	Off	Load 2 OK
All LED	Green-->Red-->Green-->..	Programming

Low Voltage Disconnect Function (LVD)

- State of charge (SOC) controlled: Disconnect at 11.00 V/22.00 V to 11.70 V/23.40 V (SOC1), 11.12 V / 22.24 V to 11.76 V / 23.52 V (SOC2), 11.25 V / 22.50 V to 11.83 V / 23.63 V (SOC3), 11.38 V / 22.72 V to 11.89 V / 23.78 V (SOC4), 11.51 V / 23.02 V to 11.96 V / 23.92 V (SOC5), 11.64 V/ 23.28 V to 12.02 V / 24.04 V (SOC6) .
- Voltage controlled (LVD): Disconnect at a fixed voltage between 11.0 V / 22.0 V and 11.9/23.8 V (Step 0.1V).

Note: The two voltage levels before/ after the slash are valid for 12 V and 24 V systems respectively.

Factory Settings

You can configure CIS charge controllers via the Control Unit (CU). See CU manual for details.

	Factory setting
Load mode	Standard controlller
Low voltage disconnect	SOC4
Battery type	Sealed

Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected (1)	Protected (1)	Protected (2)
Short circuit	Protected	Protected (3)	Switches off immediately
Over current	N/A	N/A	Switches off with delay
Reverse current	Protected	N/A	N/A
Over voltage	Max. 55 V (4)	Max. 40 V	Switches off above 15.5 V / 31.0 V
Under voltage	N/A	N/A	Switches off
Over temp.	Reduces the charging current by PWM if over temperature occurs and switches off the load if the temperature reaches a high level.		

(1) Controller can not protect itself in a 24 V system; V_{panel}-$V_{battery}$ is limited to 40 V.
(2) Controller can protect itself, but loads might be damaged.
(3) Battery must be protected by fuse, or battery will be permanently damaged.
(4) The solar panel voltage should not exceed this limit for a long time as voltage protection is done by a varistor.

WARNING: The combination of different error conditions may cause damage to the controller. Always remove the error before you continue connecting the controller!

Liability Exclusion

The manufacturer shall not be liable for damages, especially on the battery, caused by use other than as intended or as mentioned in this manual or if the recommendations of the battery manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, unusual use, wrong installation, or bad system design.

Technical Data

Nominal voltage	12/24 V, automatic recognition
Boost voltage	14.4/28.8 V (25 °C), 2 h
Equalization voltage	14.8/29.6 V (25 °C), 2 h
Float voltage	13.8/27.6 V (25 °C)
Load disconnect voltage	11.00-12.02 V/22.00-24.04 V By SOC 11.0-12.0 V/22.0-24.0 V By voltage
Load reconnect voltage	12.8/25.6 V
Evening hours	0-15 hours
Morning hours	0-14 hours
Night/day detect	2.5-10 V
Battery type	Flooded, Sealed
Temp. compensation	-4.2 mV/K per cell
Max. solar current	5/10/20, According to model number @ 60 °C
Max. load current	5/10/20, According to model number @ 60 °C
Dimensions	82 x 58 x 20 mm
Weight	150 g
Wire size	CIS05: 1.5 mm^2; CIS10: 2.5 mm^2; CIS20: 4 mm^2
Typical power consumption	Lower than 8/10mA
Ambient temp. range**	-40 to +60 °C
Case protection	IP68 (1.5 m, 72 h)
Max altitude	4000 m

** :At 60 °C CIS can only have full current on Panel or Load, not together

Subject to change without notice. Version: 200900629
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Phocos AG - Germany www.phocos.com
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